

## Congress Report

# **Analytica Conference 2018 - Joint Symposium with GTFCh and GDCh on "Trends in Analytical Toxicology – New Matrices, New Methods, New Analytes". Munich (Germany), April 11, 2018**

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The Analytica Conference took place in conjunction with the Analytica fair from April 10 to 12, 2018 in Munich. The Analytica is the leading trade fair for analytical equipment and solutions, laboratory technology and life science applications in Europe.

Since many years, Professor Hans H. Maurer has been regularly invited by the Society of German Chemists (GDCh) to organize one of the symposia during the Analytica Conference on behalf of the German speaking Society of Toxicological and Forensic Chemistry (GTFCh). He could welcome over 100 participants at this year's symposium to see well known international experts speaking on different aspects of new trends in analytical toxicology including new matrices, methods, and analytes.

The first speaker was Doktor Merja A. Neukamm from the Institute of Legal Medicine – Forensic Toxicology (Freiburg, Germany). She was talking about post mortem drug testing in dental materials. Upon autopsy of skeletonized, putrefied or burnt bodies, the commonly applied materials for forensic toxicological analyses are often not available anymore and dental hard tissues might be the only remaining specimen. Incorporation of drugs into dental hard tissues can take place via the oral cavity or by blood that perfuses the tooth root. Dental materials from postmortem cases were analyzed qualitatively and quantitatively and the results were compared with those of blood, urine and hair. These studies suggest a window of detection for drugs in dental materials, which lies between the window of detection in body fluids and in hair.

The presentation by Professor Christophe Stove from Ghent University (Belgium) was entitled "Drug testing by novel receptor activation assay". Amongst the new psychoactive substances (NPS), synthetic cannabinoids constitute the largest class of compounds, while synthetic opioids are undoubtedly the most deadly ones and both classes grow continuously. Previous toxicological screening methods are restricted by their targeted nature and/or may struggle to detect unknown compounds (or their metabolites) at very low concentrations. The developed strategy is based upon biological activity and may be used for activity profiling of new synthetic cannabinoids and synthetic opioids and as a first-line screening tool to identify (synthetic) cannabinoid or opioid-positive biological samples. HEK293T cells with modified cannabinoid, and  $\mu$  opioid receptors were used for the assay. Receptor activation by substrate was measured via luminescence.

The third talk was held by Professor Hans Maurer himself and was devoted to the question "Drug testing by high-resolution MS without chromatography – Dream or reality?". Gas or liquid chromatography (GC or LC) coupled to low or high resolution (HR) mass spectrometry (MS) are the gold standards for drug testing in analytical toxicology. The novel paper spray ionization (PSI) technique coupled to MS might overcome workup and separation. Hans Maurer reported about various studies that confirm the potential of this technology for quantification and/or qualitative screening in biofluids. A PSI-HRMS/MS approach was developed and suc-

cessfully validated for comprehensive urine screening by the working group of Hans Maurer. The presentation was closed with a critical discussion of the pros and cons of direct analysis approaches for drug testing purposes.

The first talk after the coffee break was held by Brigitte Desharnais (Montréal, Québec, Canada). She summarized her experiences about postmortem phenotyping. Differences in xenobiotic metabolism rate between individuals can lead to fatal intoxications. Known genetic polymorphisms (mutations) of the key metabolizing enzyme family, cytochrome P450s (CYPs), are responsible for a range of metabolizing efficiencies. Brigitte presented a method for an accurate postmortem estimation of metabolic capacity that encompasses both genetic assessment and quantitation of the protein expression level. Her initial work focused on CYP 2D6 and CYP 3A4.



Fig. 1. Speakers from left to right: Harald John, Brigitte Desharnais, Christophe Stove, Brigitte Dorner, Hans H. Maurer, and Merja A. Neukamm.

Doktor Brigitte Dorner (Centre for Biological Threats and Special Pathogens, Robert Koch-Institute, Berlin, Germany) talked about the recent progress to detect exposure to high molecular weight toxins from ricin to botulinum toxins. Detection of such biological toxins is a challenge since the molecules are active also in the absence of the producing organism and its genetic information. Therefore, detection on the nucleic acid level is not sufficient (other than for pathogens) – the proteins themselves have to be detected. Their extraordinary toxicity demands for detection limits down to a few pg/mL. Most challenging is the fact that biological toxins are often produced in numerous variants or isoforms that might or might not differ in their characteristics. Her strategy to tackle the challenge of high variability and the need for ultimate sensitivity is to use a combination of methods at different technical levels: immunological, functional, and spectrometric approaches or combinations thereof.

Finally, Professor Harald John (Institute of Pharmacology and Toxicology, German armed forces, Munich, Germany) held the last talk of the symposium about protein adducts in post-exposure analysis for verification of chemical warfare agent (CWA) exposure. The presentation introduced to relevant methodological details as well as applications to real cases of pesticide poisoning in Germany as well as CWA poisoning discovered in Syria a few years before.



Fig. 2. Interested Audience at the Analytica Conference.

After four hours of an exciting symposium, chairman Hans Maurer thanked the speakers and the audience and closed the session inviting everybody to the next Analytica Conference in 2020. This and the next symposium was and will be accredited by the GTFCh with credit points for members who are already certified Forensic Toxicologists GTFCh, Forensic Chemists GTFCh, Clinical Toxicologists GTFCh, or Forensic Clinical Chemists GTFCh.